

Turtle River Times

The Newsletter of the A.R.M. Loxahatchee National Wildlife Refuge

Issue 9
May/2005 - Oct/2005

PROJECTS ABOUND AT THE REFUGE

By Rolf Olson, Deputy Manager

While visiting the refuge this year you have probably seen or heard some unusual things. Concrete trucks, brick layers, plumbers, cranes, and backhoes have been busy conducting a number of refuge improvements this year, which will continue into the next two years.

Most noticeable is the new restroom facility near the Cypress Boardwalk. These new bathrooms will allow the refuge visitor to have access to them when the center is closed. The new facility will also be fully accessible to mobility impaired visitors. The bathroom space in the Visitor Center will be converted into much needed storage or office space.

Running simultaneously to this project is the remodeling of Building Five which once housed refuge vehicles. Building Five provides office space to the majority of our biology and fire management staff. In addition, a number of researchers, interns, and two biologists from the U.S. Fish and Wildlife Services Ecological Service's Office also have offices there. These folks were crowded into one of our houses that had been converted into a make shift office. In addition to office space, the building has two storage rooms, a wet laboratory, and a library.



New rest rooms



Installation of the new P-3 structure

Also completed was the replacement of an old pump in the centerline canal in the middle of Compartment C, formerly called the P-3 Pump. In the old days, this pump used to move water from the Lake Worth Drainage District Canal (C-30) in and out of the refuge impoundments. For water quality reasons, it was determined that water would only be discharged from this area and water would not be allowed back onto the refuge from this canal. The old pump had long since been removed leaving a metal pipe gate between the two canals. When we wanted to remove water from the Centerline Canal the maintenance staff would have to take a bulldozer and rotate the pipe open and closed. Every time we opened the pipe there was a good

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Close-up of new P-3 structure

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Visit the refuge often on the web at <http://loxahatchee.fws.gov/>

New Tools to Track Water in the Refuge

by Matt Harwell, Senior Ecologist

Water is the lifeblood of the refuge. The amount of water in the marsh drives the ecology. Water level in the marsh is driven by a combination of rainfall, water movement in and out of the perimeter canals from pumps and other structures, and the influence of evaporation. The source of the water that reaches the marsh can influence the ecology of the wetland. Rainwater has very few nutrients (and other elements) in it – this used to be the dominant source of water in the area before humans came along with canals, agriculture, and development. Canal water, composed of agriculture and urban runoff, has lots of nutrients (and other things) in it, which may not be ideal for parts of the ecosystem. Scientists have clearly documented changes in periphyton communities (a complex assemblage of algae and other microorganisms), the base of the food web in the Everglades, as well as the unwanted expansion of cattail in areas where water with high nutrients enters the marsh.

Refuge staff monitor both water levels and what is in the water in the marsh through routine sampling – typically on a monthly basis. These data are of direct use in refuge management decisions. While this routine sampling is very important for us, there is a wealth of information about what happens between routine sampling events we don't know about.

To help provide information between monthly sampling, refuge staff have recently acquired and set up equipment to monitor both water levels and the source of water on an hourly basis. This equipment (called data sondes) allows for near-continuous recording of conditions in the marsh, with minimal need to put refuge staff in the

interior to do this work – they only have to go out to collect the data, check the batteries, and clean the instruments. These leave-in-the-field devices have been placed in the interior in multiple locations. Currently, these devices are located in the outer “fringe” of the refuge interior to capture information about the marsh that is most influenced by water from the perimeter canals.

A water level recorder is a device that monitors the water level at a fixed location over a period of time. There are more than half a dozen water level recorders currently set out in the marsh.

A data sonde is a device that can monitor environmental conditions in the field over a long period of time. A large number of data sondes have been put in the interior of the refuge, specifically to measure conductivity. Conductivity is a water quality parameter that measures the amount of solids in the water, and is one good way that refuge staff can track the level of canal water intrusion into the refuge interior. Conductivity in the canal water is about 10 times higher than in the marsh.

Collecting information with these devices for several years will significantly improve our understanding of the ecology of the refuge. In addition, this information will be used for both real-time management decisions and to help lay out strategies for water management in the long-term. After all, water is the lifeblood of the refuge!



Left side - scientists setting up water level recorder; the arrow shows sensor. Right side – the water level recorder is deployed. The recording part is shown by the arrow.



Top half – data sonde before being put in the field. The recording sensors are on the left side of the sonde (arrow). Most of the length of the sonde is taken up by batteries. Bottom half – scientist putting data sonde in the field. The sonde is placed flat (arrow) between two pipes so it is covered by water.

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chance that we would not be able to close it again thus draining our Centerline Canal and possibly all of the C Impoundments.

In 2005, we will also be building new facilities, replacing existing facilities, and repairing storm damage. Some of the more exciting projects are:

With the help of the Friends of A.R.M. Loxahatchee NWR we will be building a new 200 foot fishing pier and making other improvements at the Headquarters (Lee Road) boat ramps. This project will hopefully cut down on the number of conflicts between alligators and bank fishermen and allow us to keep this area open to bank fishing more days throughout the year.

We will also be replacing the Chickee Hut that was destroyed during last year's hurricanes with a more hurricane resistant structure.

The vinyl siding on the refuge Visitor Center will be replaced with a more durable and visually pleasing siding, most likely a concrete or masonry siding. This siding should drastically improve the appearance and hurricane resistance of the Visitor Center.

The interpretive signs on the Marsh Trail and the Canoe Trail will be replaced with new up-to-date signs. These signs will provide information on current management practices and will sport an aesthetically pleasing low profile design.

The current refuge Administrative Office will be replaced with a new building. The old Administrative Office was built in 1982 and has a number of serious issues including mold, wood rot, and general deterioration. The new office will be built on dry ground and will provide a more functional work environment for the staff housed in it.

Last but not least we will be doing some improvements to our C Impoundments. Gravity flow water control structures will be installed between impoundments allowing us to move water from one impoundment to another without using those loud, smelly, and very ugly diesel pumps. We will also be creating more diversity in some of the impoundments by making deeper areas, sandy areas, and possibly planting some trees.

All kinds of interesting things are happening at the Refuge!

Refuge Volunteers A Vital Resource

by Lois Chapman, Refuge Ranger

"Did you see that?" "What was that?" "Where can I find an alligator?" These questions and more are asked by the average visitor. The folks who answer these questions are often refuge volunteers.

Volunteerism is the life-blood to the refuge visitor services program. If you go on a guided walk or have an encounter with a person interpreting wildlife on the Marsh Trail, chances are you were informed by a volunteer. Volunteers can be seen working in the visitor center, leading walks and tours, interpreting wildlife along trails, working in the butterfly garden, conducting canoe trips, speaking to off-site groups, maintaining refuge grounds and public use areas, and removing exotic invasive plants.

Each year, the refuge staff organizes a volunteer awards program to honor and say thank you to the volunteers for a job well done. Recognition is given for hours contributed and special projects. Eighty-five volunteers and staff attended this year's ceremony at the South County Civic Center in Delray Beach. This year, special recognition was given to Jim Marshall for his 18 years of service in the volunteer maintenance program, also affectionately known as the Grumpy Old Men Construction Company. In addition to the sometimes hot and sweaty work, Jim was also the group's unofficial foreman. Thank you Jim for a job well done!

If you are interested in our natural areas, have a desire to work with people, lead tours, or maintain the refuge grounds, then the refuge volunteer program may be for you. Volunteers are also needed for data entry, organizing the refuge slide file system, working in the butterfly garden, and removing exotic invasive plants.

If you would like to become a refuge volunteer or for more information, contact Lois Chapman or Krista Markwardt at (561) 735-6030 or 734-8303.



Jim Marshall receives 18 year service award from Manager Musaus



Maintenance Volunteers in Action

"Putting Faces to Names"

by Krista Markwardt, Refuge Ranger

Kevin Maier, Wildland and Prescribed Fire Technician



The refuge is pleased to welcome Kevin Maier, Wildland and Prescribed Fire Technician, to the Loxahatchee team. As a part of the Fire Program team, Kevin assists in the development of plans and schedules for prescribed burns, as well as, fighting wildfires that occur on the refuge. Kevin grew up in Boca Raton, Florida and graduated from the University of Florida. He comes to Loxahatchee from California where he spent the last three years fighting wildfires as a Smoke Jumper. Welcome Kevin!

Engine #671, Fire Truck



Engine #671 joined the Loxahatchee Fire Program team in January 2005. The engine assists at prescribed burns and wildfires at Loxahatchee and other refuges.

Donatto Surratt, Ecologist



On February 15th, Donatto Surratt joined the Everglades Program Team. Donatto will help manage water quality monitoring and data interpretation for the Enhanced Water Quality Monitoring project on the refuge. He has a PhD from Florida A&M University. Donatto's research reproduced the historic (50-60 years) patterns of organic matter (Carbon, Nitrogen, and Phosphorus) deposition for the Apalachicola Bay. We are pleased to welcome Donatto Surratt to the Loxahatchee team.

Rob Smith, Biological Technician (Water Quality)

Rob Smith joined the Enhanced Water Quality Monitoring project in March 2005. As part of the project, Rob will be collecting water samples and downloading data from field instruments that collect



conductivity on an hourly basis. Rob received his Masters Degree in Zoology from Brigham Young University and has spent the last four years working with the U.S. Fish and Wildlife Service's Ecological Services in New Jersey. Welcome Rob!

Meet the Staff

Project Leader.... Mark Musaus

Deputy Project Leader.... Rolf Olson

Administration.... Kim Arserio, Jean Ryan

Everglades Program Team.... Nick Aumen, Matt Harwell, Leslie MacGregor, Jose Quinones, Michael Waldon

USFWS Ecological Services.... Cindy Brashear, Susan Teel

Law Enforcement.... William Calvert, Jared Klein

Wildlife and Habitat Management.... Laura Brandt, Jennifer Hinckley, Kevin Maier, Gayle Martin, Stefani Melvin, William G. Miller, Don Napier, George Pelt, Rob Smith, Donatto Surratt

Maintenance Operations.... Manuel Garcia, Jerry Grist, Allan Hansen, Steve Matzkow

Environmental Education & Interpretation.... Lois Chapman, Krista Markwardt, Serena Rinker

Fee Staff.... Keith Boliek, Lew Hecker, Marie Pohl

LILA On-site Manager ... Eric Cline (SFWMD)

LILA Update

by Eric Cline, SFWMD

The Loxahatchee Impoundment Landscape Assessment project or LILA, is a one-of-a-kind ecological restoration and assessment project located on the Refuge. The South Florida Water Management District (SFWMD) has partnered with the U.S. Fish and Wildlife Service as well as the Army Corp of Engineers to create a landscape-size replica of the Everglades. LILA is a tool that will help scientists, engineers and the general public better understand the effects of flowing water on the soil, plant and wildlife communities of the Everglades.

In order to study and understand flowing water and its relationship to the Everglades, one important task in that process is to get the water moving. Many of you may have seen the large yellow mechanism that was installed in the center canal over the Christmas holidays. In order to keep water moving in LILA, the recirculation pump needs to be kept free of floating vegetation at all times. Early on in the project we noticed that the pump would become clogged with this vegetation and a safety switch would shut the system down. To alleviate this problem the SFWMD installed what is called a "Flex – rake". This rake clears the pump of any clogs and allows the water to recirculate 24 hours a day, 7 days a week just like in the Everglades.

Over the next few months we plan to use that flowing water to continue to test the capabilities of the LILA system. We are particularly interested in how fast the water flows through the system. Scientists believe that water historically flowed through the Everglades very slowly, 1 to 2 centimeters per second. So it is important that LILA can mimic those same slow flows. We also think that high flow events like those that would occur during heavy rains are critical in maintaining the Everglades landscape. This work requires very accurate measurements over relatively long periods of time. If you see scientists wading out in the sloughs of LILA, they are most likely downloading water flow data from several instruments we have deployed.

Another important task that will be initiated over the summer is preparing the eight tree islands for the second phase of tree planting. A temporary sprinkler system will be installed and some vegetation will be cleared out to make room for more trees. In the mean time we need to continue to assess the health and well-being of the trees that were planted in May of 2004. These trees were put under a lot of strain by drought conditions

during the 2004 summer and of course, the hurricanes in the fall. However, we are learning which species are well-adapted for survival under those harsh conditions, which could be useful in picking species suited for tree island restoration in the Everglades.

Lastly, I would like to thank all those who came out to visit with me and the LILA wildlife crew (Erynn Call, Mac Kobza and Mark Cook) on Everglades Day. We had a great time, who wouldn't have fun driving a Harley Davidson golf cart, and hope that all of our guests did as well.



Local contractors installing Flex-Rake



Researchers discussing velocity meter installation



LILA aerial view

Who's a Pest?

by Gayle Martin, Biology Technician (Exotics)

Most people have very negative reactions to insects and often consider them pests. At the A.R.M. Loxahatchee NWR non-native plants are the pests and insects are a valuable management strategy. Since 1997, three species of insects have been introduced into the refuge as a method for controlling melaleuca (*Melaleuca quinquenervia*) and Old World climbing fern (*Lygodium microphyllum*). These two exotic plants have invaded over 105,000 acres of the marsh interior collectively.



One mature melaleuca tree is capable of producing millions of seeds in a year

The melaleuca tree is from Australia and is easily identified by its papery bark. It was intentionally planted in the Everglades in the 1920s to 'dry' up the area for development. Lygodium is a very wiry fern-like vine native to Southeast Asia, Africa, and Australia.

Biological, physical, and chemical control methods are used to reduce exotic pest plants with the least amount of disruption to the natural environment. This combination of strategies is referred to as integrated pest management. Biological control seeks insects and/or diseases of the plant in its native range and introduces them against the plant in the area where it has become a problem. Extensive research is done to ensure that the control agent will only affect the targeted plant before it is approved for release. In February 2005, the USDA Agricultural Research Service released the first biocontrol for lygodium, a defoliating moth, into the Refuge. Caterpillars of the Lygodium moth (*Austromusotima camptonozale*) strictly eat lygodium leaves, killing small plants and weakening larger ones. The adult



Adult melaleuca psyllid

moths live for only 3-5 days and consume nectar. It may take years before the population is large enough to have a significant

impact on its target.

The melaleuca snout beetle (*Oxyops vitiosa*) and melaleuca psyllid (*Boreioglycaspis melaleucae*) were introduced into the Refuge by the USDA in 1997 and

2001, respectively. These insects feed upon new shoots and flowers, affecting the tree's ability to produce more seeds. After a slow start, both insects are reproducing and dispersing within the marsh interior. Another insect has been identified as a potential control agent for melaleuca, the bud gall fly (*Fergusonina turneri*) and its obligate nematode (*Fergusobia quinquenervia*). Female flies are infected with parasitic female nematodes, nematode eggs and juveniles. When the fly deposits its eggs into the developing melaleuca buds, it is also implanting the juvenile nematodes. The nematodes create galls on the bud, fly larvae feed on the gall tissue, and the fly finishes development within the gall. This series of interactions results in the reduction of melaleuca seed production and seedling survival.

These biological controls will support the Refuge's continuing efforts to manage melaleuca and lygodium through exotic removal contracts, in-house treatments, and prescribed fires. Over 28,000 acres in the southern portion of the interior have received initial herbicidal and mechanical treatments for exotic plants. In 2004, approximately 7,000 acres were burned in a prescribed fire. Controlled burns are a useful physical method for controlling small saplings and reducing dead biomass. Most of the southern half of the interior will have been initially cleared of exotics by 2007.



Melaleuca snout beetle larvae

Regular Activities and Events Descriptions

(see calendar for dates, places, & times)

Morning Bird Walks – This one-mile walk is for the birds and the early risers. Bring binocular, field guide, and insect repellent.

STA1-West Birding – An off-site escorted auto trip into a filtration marsh operated by the SFWMD. Approximately 3 hours. Bring binocular/scope, field guide, water/snack, sun/rain protection, insect repellent. Must be willing to car pool. **RESERVATION REQUIRED** Call 561-735-6030 and if no answer call 561-732-3684. Watch for upcoming announcements.

“Canoeing the Everglades” – Take a two-hour journey through the Everglades with an interpreter on our canoe trail. Bring canoe, PFD, water, sun/rain protection, and insect repellent. **RESERVATION REQUIRED** Call 561-735-6030 and if no answer call 561-732-3684

“All About Nature” Walks – Join a naturalist for a discovery tour of the plants and “critters” that call the refuge home.

Reptile and Amphibian Walk

Join a volunteer naturalist on a walk to find the reptiles and amphibians of the refuge.

Swamp Strolls – Enjoy the beauty of a cypress swamp from a half-mile long boardwalk trail. Learn about “swamp tea,” floating plants, and thigmotrophism as a naturalist reveals the swamp’s secrets to visitors.

Special Programs

International Migratory Bird Day (IMBD) at the Palm Beach Zoo at Dreher Park

May 14 9:00AM-4:00PM

As part of the celebration of IMBD, the Refuge and Zoo staff will present bird programs and activities, face painting, bird bio-fact stations, and environmental arts and crafts. This year’s theme is Collisions: Clear the Way for Birds. A fun event for all ages.

Kid’s Fishing Day

June 11 7:30AM-12:30PM

As part of National Fishing and Boating Week, children are invited to learn about freshwater fish, how to trap minnows, fishing rules and regulations, and how to catch fish. For children up to 12 years of age, accompanied by an adult. **RESERVATIONS REQUIRED (LIMITED SPACES AVAILABLE)** Call 561-735-6029



Visitors on a nature tour



Fishing Day success!

Events with an asterick (*) Require RESERVATIONS - please call 561-734-8303 or 561-735-6030 and if no answer call 561-732-3684

MT = Marsh Trail

HQBR = Headquarters Boat Ramp

VC = Visitor Center

Refuge Hours & Fees

The refuge is open to the public from sunrise to sunset daily. Exact times are posted at each entrance and on our website and change with the hours of daylight. Currently the refuge opens at 6:00AM and closes at dusk.

Summer hours for the Visitor Center which begin on May 2 are Wednesday through Friday, 9:00AM to 4:00PM and Saturday and Sunday from 9:00AM to 4:30PM.

A fee of \$5.00 is charged to private vehicles entering the refuge. When the fee booth is unmanned, visitors are subject to the honor system and should pay at the fee shelter next to the fee booth. Various passes are available. Check at the Visitor Center or Fee Booth for details.

May 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 Visitor Center Closed	3 Visitor Center Closed	4	5	6	7 Bird Walk 7:30AM (MT)
8	9 Visitor Center Closed	10 Visitor Center Closed	11	12	13	14 IMBD at Palm Bch Zoo-All Day
15 Swamp Stroll 2PM (VC)	16 Visitor Center Closed	17 Visitor Center Closed	18	19	20	21
22 Reptile and Amphibian Walk 11:00AM (VC)	23 Visitor Center Closed	24 Visitor Center Closed	25	26	27	28 Nature Walk 10AM (MT)
29 Swamp Stroll 2:00PM (VC)	30 Visitor Center Closed	31 Visitor Center Closed				

2004/2005 Loxahatchee Events Schedule: May - August

June 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4 Bird Walk 7:30AM (MT)
5	6 Visitor Center Closed	7 Visitor Center Closed	8	9	10	11 *Kid's Fishing Day Nature Walk 10AM (MT)
12 Swamp Stroll 2PM (VC)	13 Visitor Center Closed	14 Visitor Center Closed	15	16	17	18 *Canoe Trip 8:00AM (HQBR)
19	20 Visitor Center Closed	21 Visitor Center Closed	22	23	24	25 Butterflies/Wild- flowers Walk 10:00AM (VC)
26 Swamp Stroll 2:00PM (VC)	27 Visitor Center Closed	28 Visitor Center Closed	29	30		

July 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
3	4 Visitor Center Closed	5 Visitor Center Closed	6	7	8	9 Nature Walk 10AM (MT)
10 Swamp Stroll 2PM (VC)	11 Visitor Center Closed	12 Visitor Center Closed	13	14	15	16 *Canoe Trip 8:00AM (HQBR)

Events with an asterick (*) Require RESERVATIONS - please call 561-734-8303 or 561-735-6030 and if no answer call 561-732-3684

MT = Marsh Trail

HQBR = Headquarters Boat Ramp

VC = Visitor Center

2004/2005 Loxahatchee Events Schedule: May - August

Events with an asterisk (*) Require RESERVATIONS - please call 561-734-8303 or 561-735-6030 and if no answer call 561-732-3684

MT = Marsh Trail

HQBR = Headquarters Boat Ramp

VC = Visitor Center

July 2005 (continued)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
17 Reptile and Amphibian Walk 11:00AM (VC)	18 Visitor Center Closed	19 Visitor Center Closed	20	21	22	23 Butterflies/Wild- flowers Walk 10:00AM (VC)
24 Swamp Stroll 2:00PM (VC)	25 Visitor Center Closed	26 Visitor Center Closed	27	28	29	30 Bird Walk 7:30AM (MT)

August 2005

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Visitor Center Closed	2 Visitor Center Closed	3	4	5	6 Nature Walk 10AM (MT)
7 Swamp Stroll 2PM (VC)	8 Visitor Center Closed	9 Visitor Center Closed	10	11	12	13 *Canoe Trip 8:00AM (HQBR)
14	15 Visitor Center Closed	16 Visitor Center Closed	17	18	19	20 Butterflies/Wild- flowers Walk 10:00AM (VC)
21 Swamp Stroll 2:00PM (VC)	22 Visitor Center Closed	23 Visitor Center Closed	24	25	26	27 Bird Walk 7:30AM (MT)
28	28 Visitor Center Closed	30 Visitor Center Closed	31			

PLEASE NOTE: THERE ARE NO SCHEDULED ACTIVITIES IN SEPTEMBER

October 2005

WATCH FOR SPECIAL ANNOUNCEMENTS FOR NATIONAL WILDLIFE REFUGE WEEK ACTIVITIES

Prescribed Fires Benefit Refuge

by Jennifer Hinckley, Prescribed Fire Specialist

The refuge's fire management program relies on two types of fires on the refuge - prescribed fires and wildfires. Prescribed fires are fires that are intentionally set in a specific area to mimic a natural wildfire that could occur. More recently, prescribed fires are being used as a tool toward the preservation of migratory bird habitat, and in combating the spread of harmful exotic plant species on the refuge. Most wildfires in the Everglades occur naturally due to lightning strikes. Fire plays an important role in the ecosystem by balancing the unique mosaic of plants and animals in the Everglades.

Prescribed fires on the refuge included, impoundments C-10 and B-2, as well as, over 7,000 acres on the southwestern side of the interior and 1,000 acres near Hillsboro boat ramp. Three wildfires occurred on the refuge during June 2004 and July 2004, the Fuzz Fire (441 acres), the 30-minute fire (50 acres), and the Sunshower Fire (150 acres). A wildfire in Water Conservation Area 2 (managed by the State of Florida) jumped the L-39 levee (the south end of the refuge) into the south portion of the refuge. Due to the 7,000 acre prescribed fire, the wildfire did not have the plant material to sustain it and went out.

The refuge fire staff has begun the process of preparing for this year's prescribed fires. Prescribed fires are being planned for approximately 12,000 acres. The main area will be located east of last year's burn in the south central part of the interior. Other prescribed fires will include impoundments C-7 and C-9.

In the fall, the fire staff is planning another photographic presentation on the prescribed fires and wildfires that happened on the refuge this year. We hope to see you there.



Prescribed burn in the southwest region of the refuge



Fuzz Wildfire in the north region of the refuge



Hillsboro Canal Wildfire



Drip torches are often used in prescribed burns

Feature Creature

Pig Frog (*Rana grylio*)

by Stefani Melvin, Refuge Biologist

Brrp Brrp! Brrp brrp! Splash!

You've probably heard this loud sound followed by a splash while walking along the Marsh Trail or Cypress Boardwalk. If you have, you have heard the Pig Frog, one of the Everglade's largest frog species. This frog can reach lengths in excess of 5 inches. They are similar to the Bullfrog (*Rana catesbeiana*) in body structure and shape, but unlike their larger cousin, Pig Frogs have complete webbing between and to the tips of their toes on the hind feet. Pig Frogs can range in color anywhere from olive green to dark brown with prominent dark spots and a cream belly. However, this species is highly aquatic, spending most of its time at least partially submerged. Often you will only see the eyes and snout above the water. Males can be distinguished from females by the size of the tympanic membrane, the circular structure located right behind the eye. This membrane acts as the frog's eardrum. In males, the tympanic membrane is considerably larger than the eye, while in females it will be the same size or smaller than the eye. Do you suppose this means the males hear better than the females?



Photo: Alana Edwards, F.A.U.

The Pig Frog is found in throughout the southeastern coastal United States, from extreme eastern Texas and to the south-central South Carolina coast. In many parts of their range, they are hunted for their edible legs. The breeding season is from March through September, although the adults emit their distinctive grunt-like call all year long. Tadpoles of this frog species are large (5") and green, and they transform into adults within about 2 years. Pig Frogs are common here at the A.R.M. Loxahatchee National Wildlife Refuge, calling from

the aquatic vegetation in the marsh impoundments, the cypress swamp, and the Refuge interior.



Please Join Us

• Membership Application • Friends of the Arthur R. Marshall Loxahatchee National Wildlife Refuge

- | | |
|---|---|
| <input type="checkbox"/> Individual \$15.00 | <input type="checkbox"/> Student (to age 18) \$5.00 |
| <input type="checkbox"/> Family \$25.00 | <input type="checkbox"/> Supporting \$50 |
| <input type="checkbox"/> Organization \$100 | <input type="checkbox"/> Contribution _____ |

Please mail this form to:
Friends of the Loxahatchee Refuge
P.O. Box 6777
Delray Beach, FL. 33482-6777

Make checks payable to:
"Friends of the Loxahatchee Refuge"

If paying by credit card please indicate:
____ Visa ____ MasterCard ____ Discover

Credit Card # _____

Expiration Date _____

Signature _____ Phone _____

Name (please print) _____

E-Mail _____

Street _____ City _____

____ Zip _____

For further information about the Friends of the Refuge
please contact:

Arthur R. Marshall National Wildlife Refuge
10216 Lee Road
Boynton Beach, FL 33437-4796
(561) 734-8303 or (561) 732-3684

What's Happening in the Impoundments

by Stefani Melvin, Refuge Biologist

South Florida experienced drought conditions during the dry season again this year. Below-average rainfall made water management in the impoundments a challenge. The LILA project came online early in 2005, and water began circulating regularly through the macrocosms in C3 and C4 (refer to map on last page). To facilitate LILA activities, the water level in the center canal must be kept very low. Low canal stages make putting water into the eastern C compartments impossible without using a pump. Pumping will be necessary indefinitely, so periodic blockages of portions of the Marsh Trail will occur. The Visitor's Center staff will be kept notified as to when and where these blockages will happen.

Over the winter months, bird use of the C-10 compartment was very high. Mottled ducks, blue-winged teal, green-winged teal, and even ring-necked ducks were observed using this impoundment. Other interesting visitors included common snipe, killdeer, black-necked stilts, solitary sandpipers, greater yellowlegs, and western sandpipers. These species were primarily using mudflats that were created by the prescribed burn in June 2004. By December 2004, vegetation had re-grown in the burned area, but many openings in the vegetation persisted. These openings provided excellent foraging habitat for wading birds, including wood storks. During one bird survey of C-10, 28 wood storks were observed. Compartments C-7 and C-6 were cookie cut late this year due to the hurricanes that hit the Refuge in September. After cookie cutting, snail kites were seen foraging and roosting in C-7. In addition, a snow goose paid a short visit during February, giving local birders a little bit of excitement.

In May, we will be preparing for the prescribed burning season. Herbicide will be applied via helicopter to compartments C-7 and C-9. Over the next 30 days, all of the vegetation will die off, so the vegetation in those two impoundments will be very brown. Pumping may be required prior to the herbicide application in order to bring the water levels down. Therefore, the marsh trail may be blocked temporarily. In the first two weeks of June, we will burn both impoundments, protecting the small cypress stand in C-9. The burn will be fairly complete, so expect to see nothing but bare dirt for a while afterwards. As soon as the burn is

over, we will bring the water levels up in C-7 and C-9 to at least 1 foot deep. The water level will be maintained at this level or higher throughout the summer months to prevent colonization of the bare soils by invasive exotic plant species. Beginning in early fall, water levels will begin to be lowered in preparation for the arrival of winter migrants.

Two research projects will be on going in the C impoundments over the summer and fall. After the burn in C-9, several test plots will be established to examine the viability of growing native wildlife food plants. We plan to start with horned beakrush (*Rynchospora inundata*), which is a favorite food of waterfowl. Seeds were collected from the interior of the refuge in August and will be spread in plots set up on the dry soil of C-9 after the burn. The plots will be monitored over the summer to see if the plants germinate and grow. With this project, we hope to find additional ways to entice wildlife into the impoundments by propagating some of their favorite native food plants. The second project will be the post-burn bird surveys. Bird surveys have been conducted in C-7 and C-9 over the winter to provide pre-burn winter bird data. We will follow these surveys up with post-burn surveys to determine the effect of the prescribed burns on bird use of the impoundments.



Cookie cutting in compartment C-7

Refuge Fun Facts - Migration Mystery

by Chrissanna (gator) Srdoch - University of Florida

Why do birds migrate?

Birds migrate so that they will be able to find food. In the south, it stays warm all year long, so many birds fly south during the cold winter months. But in the summer, it stays daylight longer in the north than in the south, so they fly back each spring. More daylight hours mean more time for the birds to find food and raise their babies than if they had stayed south where it is warm all year round.



Robin

How do birds know when to migrate?

We don't really know how they know when to migrate. It might be the slant of the sun or changes in the weather. Or it might be an internal urge that they have (possibly caused by hormones). But somehow they know.

Before leaving on their migration trip, birds generally store up body fat for the trip. This helps them to survive the long journey and gives them the extra energy they need to fly so far.

Do all birds migrate?

No. Not all birds migrate. Some kinds of bird live in the same place all year long. They are called a resident species.



Painted Bunting

Think about it. If a bird eats bugs, will it be easy for them to find bugs in the snow? Probably not. But what if a bird eats nuts and seeds? Do you think it would be able to find that in the snow? It sure would be easier!

Birds are not the only animals that migrate. Some fish migrate. Sea turtles migrate. And we can't forget about monarch butterflies. Even some mammals migrate.



Yellow Warbler

Where do birds migrate to?

Here in the Northern Hemisphere (the area above the Equator), the birds usually migrate south to warmer temperatures in the fall. Then, in the spring they will migrate back to their homes in the north to live for the summer and to raise their young birds.

How do birds know where to go when they migrate?

We're not really sure how birds know where to go when they migrate. They might use the sun or stars to guide them. Or they may follow the land below them as they fly. Another possibility is that they just know where to go. This is called the homing instinct. And, believe it or not, sometimes the migrating birds do get lost. They can get thrown off their migration route by storms and winds.



Goldfinch

Why are Wildlife Refuges important to migrating birds?

Wildlife refuges and other undisturbed areas give migrating birds a place to stop on their long trips. Think about when you're in the car for a long time, are you excited when the car finally stops at a rest stop and you can get out and take a break? Refuges are like rest stops for birds. They can take a break from their long trip, get some more food, and then continue on their way. Sure, they don't have to always stop at a refuge, but it's a lot nicer and safer than stopping in the middle of a city or town. That's one reason why it is so important that we set aside places for our animal friends like Robbie the Redstart.



Catbird and babies

Annie's Big Adventure

story by Chrissanna (gator) Srdoch - University of Florida

artwork by Frank Lohan

Remember our little Annie? On that dark and stormy night during hurricane Irene, she was blown from her warm and cozy nest, AND HER MOMMY! Well ... Thank goodness ... she finally found her Mommy, now she will learn all about the refuge from Abigail and all of her new friends !!

Annie Meets Robbie the Redstart

I can't believe that it's already April, thought Annie as she caught another fish. Over the winter, Annie and her brother and sister had been practicing their fishing and were very pleased with how well they were doing. Deep in thought, Annie almost missed the flash of black and orange nearby. What could that be? She wondered, as she crept closer.

"Hello?" Annie said carefully. After all, she had been told over and over again not to talk to strangers. "Who are you? I've never seen any birds like you here before."

"Oh, hello. My name is Robbie. I'm an American Redstart and I'm just passing through. You see, it's a long trip to go all the way from Central America to my home at Patuxent Wildlife Refuge, in Maryland. Sometimes I need a break, and today I decided to take one. I like stopping at wildlife refuges because they're safe and I can catch some flies to eat and rest before I fly some more."

**Robbie the Redstart**

Now Annie was really confused. Why would a bird fly all the way from Maryland to Central America? Surely he was up to no good; otherwise he would be sensible and stay in one place like she did. "That's nice," Annie said to him. "But I really should be going. Have a nice rest of your trip." Annie said politely, before rushing off to go ask her mother about the stranger she had seen.

"Oh, Annie!" Her mother sighed when Annie told her the story. "Robbie is perfectly safe. In fact, he's a good friend of mine and I was going to introduce you to him later. You've never met him before because he doesn't live around here. He only passes through on his trips. Robbie is what people call a migratory bird. In the summer, he lives in Maryland. But in the winter, he goes south to Central America, where it's warmer. I saw him yesterday, and he said he's on his way back north again for the summer. Robbie likes to stop here because wildlife refuges make good places to stop. There is food for tired migratory birds like him to catch and eat. So many places have buildings and houses now, that it can get hard for them to find good places to rest and eat."

Annie thought for a minute. "Now it makes sense!" Annie exclaimed. "So he's supposed to be here. I can't wait to find him again!" Annie looked around. "What if he's already left? I want to ask him all about the places he sees on his trip. I wonder if there are any anhingas in Central America. Where did he stop before this? Are there a lot of Wildlife Refuges to see on the way? Oh, Mommy, do you think he would let me go with him?"

"Absolutely not," Abigail said quickly. "But you can ask him the rest of your questions when you see him later."

**Annie the Aninga****Rocky the Raccoon****Otto the Otter****Ally the Alligator****Bertha the Butterfly**

